

## Review Article

# Bell's Palsy and Its Prosthodontic Significance

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### ABSTRACT

Rehabilitation of compromised patient has always been a challenge to the medical field. Prosthodontic management in a facial palsy patient is a difficult task to accomplish. This requires alteration of conventional procedures. This article presents bells palsy ,its etiology,symptoms , prosthodontic significance and discussed the most effective methods of treating such dental patients.

### INTRODUCTION

The most common cause of acute unilateral facial paralysis (60 - 75% of cases) is Bell's palsy. World wide, it is one of the most common neurologic disorders of the cranial nerves and it is the most common cause of facial paralysis. Sir Charles Bell described the name 'Bell's palsy. It is an unilateral idiopathic lower motor neuron paralysis of the facial nerve of sudden onset. On the affected side of the face ,it involves loss of muscular control. Sir Charles Bell, in 1821 demonstrated the separation of the sensory and motor innervation of the face and describe the function and anatomy of the facial nerve .

Ranging from partial and mild forms to complete form facial paresis and facial paralysis are dysfunctions of different degrees of the facial nerve . Paralysis of facial nerve is defined as severe or complete loss of facial muscle motor function. This may result from central or

peripheral lesion. It starts in the motor nucleus [namely, intra-nuclear lesions], both peripheral facial nerve branches are injured and facial palsy is located in the homolateral hemi face in case of peripheral lesion and in the motor cortex from the ascending frontal convolution up to the facial nerve nucleus in the pons (i.e. in case of supranuclear facial injuries) in case of central lesion, the lower branch of the facial nerve is affected because the upper part of the nucleus receives both homolateral and contralateral cortical afferent pathways and extrapyramidal ones. The motility of the lower face is impaired in central facial paralysis<sup>1</sup> .

### HISTORY

- Greek physicians gave brief accounts of these disorders.
- Hippocrates (5th century BCE) in the book Prorrhethics II, stated "Distortions of the face, if they

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coincide with no other disorder of the body, quickly cease, either spontaneously or as the result of treatment.

- Areteaus (Greek physician, 1st century CE) described paralysis, including parts of the face.
- Aulus Cornelius Celsus (1st century CE) described it as cynic Spasm.
- Archigenes (1st or 2<sup>nd</sup> century CE) also gave an account of facial paralysis in conjunction with cynic spasm.
- Galen (2nd century CE) described spasm of the “lips, eyes, skin of the forehead, cheeks and root of tongue hemifacial paralysis associated with brain lesions, and isolated paralysis of specific areas (“tongue, eyes, jaws, or lips)
- Caelius Aurelianus (5th century CE) separately detailed (probably following Galen’s lead) eyebrow, tongue, lip, and jaw muscle paralysis.
- Shoja et al. provides a translation of al-Hawi regarding facial palsy.
- Persian physicians, such as Ibn Sina (980–1037 CE) and Jorjani (1040– 1136 CE), reiterated condensed versions of al-Hawi, at times verbatim and without identifying the source.
- Jorjani and Ibn Sina advanced the knowledge of Razi’s al-Hawi was first translated into Latin in 1279, coming into print in Europe in 1468.
- Ibn Sina’s Canon, which was more systematic and understandable than al-Hawi, was the main textbook in many medical schools between the 14th and 16th centuries, and thus those physicians should have been exposed to Razi’s ideas.
- Douglas, Friedreich and Thomassen a thuessink also described it.
- In 1821, Sir Charles Bell described the anatomy of the facial nerve and its association with the

- unilateral facial palsy that bears his name. **Sir Charles Bell**, for whom the condition is named, presented three cases at the Royal Society of London in 1829. Two cases were idiopathic and the third was due to a tumour of the parotid gland.<sup>2</sup>

## ETIOLOGY

The etiology remains unclear. Various causes have been proposed which include viral, autoimmune, inflammatory and vascular herpes zoster oticus (Ramsay Hunt syndrome), trauma and the rarer causes including otitis media, sarcoidosis, HIV infection, autoimmune disorders or tumours of the parotid gland<sup>3</sup>, Lyme’s disease and Guillain–Barré syndrome. 20% of reported cases of facial palsies have a known etiology<sup>4</sup>. The most common upper motor neuron cause of facial paralysis is stroke and iatrogenic cause is through the administration of an inferior alveolar nerve block mainly.<sup>3</sup>

## CLINICAL FEATURES

- On the affected side, there is paralysis and weakness of the upper and the lower facial muscles. There is drooping of the ipsilateral eyelid and there is inability to close the eye completely. Due to inability to close eyes completely there is dry eye or excessive tearing of the eye.
- There is drooping of corner of the mouth.
- Ipsilateral impaired/loss of taste sensation.
- On the affected side of the mouth, there is difficulty with eating due to the ipsilateral muscle weakness causing food to be trapped on, dribbling of saliva.
- On the affected side of the face there is altered sensation, pain in or behind the ear. On affected side there is increased sensitivity to sound (hyperacusis), if stapedius muscle involved.<sup>3</sup>

## PROSTHODONTIC SIGNIFICANCE

### Objectives of prosthetic rehabilitation<sup>1</sup>

1. To support weakened facial musculature.
2. So as to decrease the amount of surgical procedures in case patient refused to have another surgery.
3. To provide mainly comfort and esthetics to the patient with improved confidence and due to positive esthetic changes improve social interactions.

In bells palsy patients ,there are many symptoms that jeopardize prosthodontic treatment . Cheek biting, uncontrolled flow of saliva, having mask like expressionless appearance, unpredictable and erratic mandibular movement are few symptoms . During impression taking, jaw relation and other procedures,they may interfere.

### -Face lift device<sup>1</sup>

It is a removable partial prosthesis which is used for patient with facial paralysis so as to support affected side muscles of the face during regeneration . Aesthetics and functions of patients face is restored with this device. Dr. Syed Kazmi used this device in 2013 to treat a patient with facial nerve paralysis with problem in phonetics and compromised aesthetics as well as mastication.

### -Edentulous Bell's palsy patients<sup>1</sup>

In addition to previously mentioned signs and symptoms of Bell's palsy, edentulous patient could suffer from:- A very clear mandibular shift toward the non-affected side along with significant difficulty in pronunciation of bilabial (p,b), labiodental and fricatives (f,v) and had a slurred speech.

-They could not perform tapping movement of mandible when instructed. Rajapur., et al. (2015) recommend a systematic stepwise approach for the rehabilitation of edentulous patient started by fabrication of interim dentures for neuromuscular training predictable mandibular movement before the fabrication of final dentures.

Rajapur., et al. used "**Lingualized Occlusion**" as previous studies have shown that it has better masticatory efficiency and prevented lateral movements of dentures. After complete denture processed, remounted laboratory and occlusal interferences were eliminated. The posterior teeth on both sides of mandibular denture were removed and flat occlusal tables were made using self-cure clear acrylic resin. The flat occlusal table used to analyze the occlusion and also to perform the tapping movement. Before complete curing of the resin, ensuring even contacts of all the palatal cusps on the mandibular occlusal flat table This is an effective method for rehabilitation of Bell's palsy patient who has very irregular and erratic mandibular movements.

### Modified complete denture<sup>1</sup>

#### -Denture with un detachable buccal plumper

This way can be obtained simply by adding wax to the labial and buccal flange of maxillary complete denture in the try in visit step. The additional material could be easily added. Amount of adding wax and its direction managed by dentist until reaching a satisfied result in terms of esthetic and speech improvement. Then complete processing of denture using heat cure acrylic resin is carried out. After dentures insertion, proper post insertion instruction should be given to patient with further inforce to oral hygiene to avoid food entrapment between the dentures and the cheeks.

**-Denture with extended buccal flange<sup>1</sup>**-This way of denture modification discussed by Godavarthi and his colleagues in 2012 for management of completely edentulous patient with Bell's palsy.

**-Denture with detachable buccal or cheek plumper<sup>1</sup>**

Also known as "cheek lifting appliance" According to Kamakshi and his colleagues, this cheek plumper was demonstrated during try in visit by placing wax in the premolar and first molar region. The waxed cheek plumper was superficially attached to the maxillary denture buccal flanges, in the affected (paralyzed) side. Plumper designed according to the available space intraorally necessary to enhance the appearance and supporting the sunken cheeks with proper thickness. This would not interfere with functional movement. After satisfactory denture try in, denture with cheek plumper was fabricated separately with a heat cure acrylic resin, then male and female parts of attachment (press button, magnets, wires and buccal tube, were imbedded in denture buccal flange out surface and plumper in surface with using self-cure acrylic resin then finishing and polishing were carried out.

**-Using of magnet attachment in detachable buccal or cheek plumper<sup>1</sup>**

Magnets are one of the common attachments utilized in dentistry and specially with the detachable cheek plumper

**-Liquid Supported Complete Denture** in maxilla edentulous area and neutral zone technique in mandibular edentulous arch is also very beneficial. The principle of this design is that liquid denture adapts continuously with mucosa. However it is also rigid to

support teeth during actual use, This design will act as a reliner for the denture and thus has an advantage over existing design. When no forces are applied, foil remains in resting position act as a soft reliner and when denture is in use vertical forces are distributed in all directions by the liquid resulting in optimal stress distribution. This helps in long term preservation of bone and tissues<sup>5</sup>.

- **Neutral Zone Philosophy** is based on concept that for each individual patient there exists within the denture space a specific area where function of musculature will not unseat denture and force generated by tongue is neutralized by lip and cheeks<sup>6</sup>.

-Facial palsy is indicative of neurological involvement. Patients with this disease can be treated but it is essential that they understand their problems. Denture retention, maxillomandibular relation records and supporting the musculature are some of the added denture problems.. Use of **non anatomic posterior teeth** minimizes the damage to the denture supporting tissues<sup>7</sup>.

## CONCLUSION

The ultimate treatment for any unrecovered facial paralysis will be a surgical intervention of the damaged nerve. When most of the cases are abandoned from surgery due to complications and other reasons, the oral prosthesis plays an important role in patient's well-being. The goal of the prosthetic treatment should be to support the weakened muscles and provide comfort and esthetics to the patient over a long period of time.

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